Transfer Function 6000 feet 26 AWG telephone cable

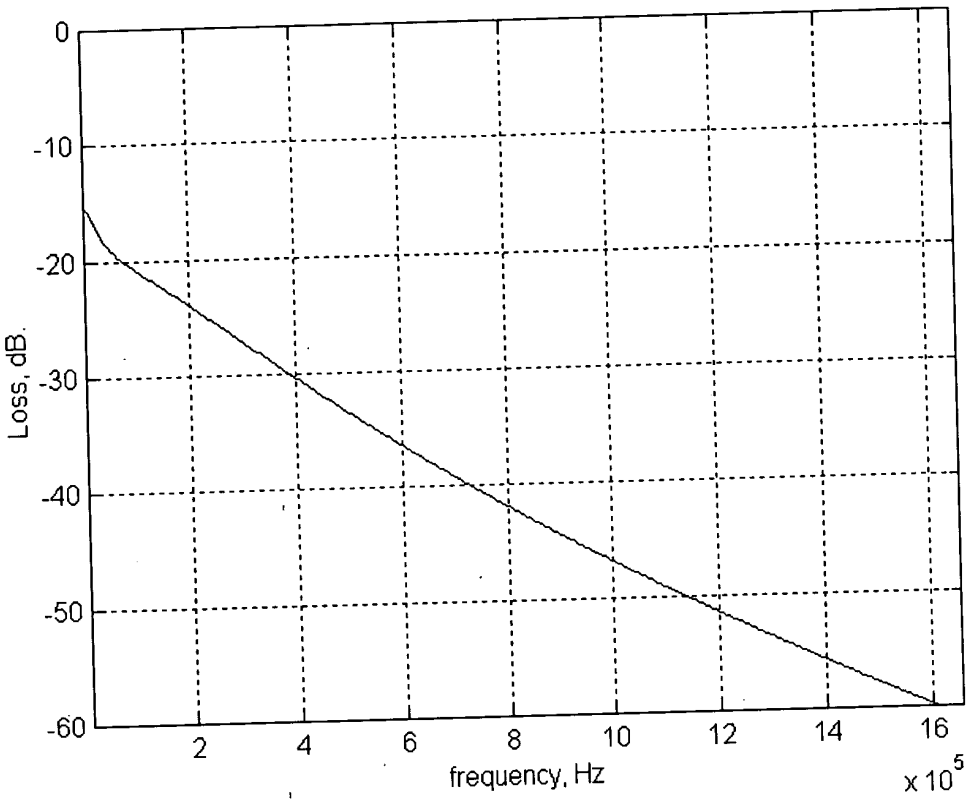


FIG. 1

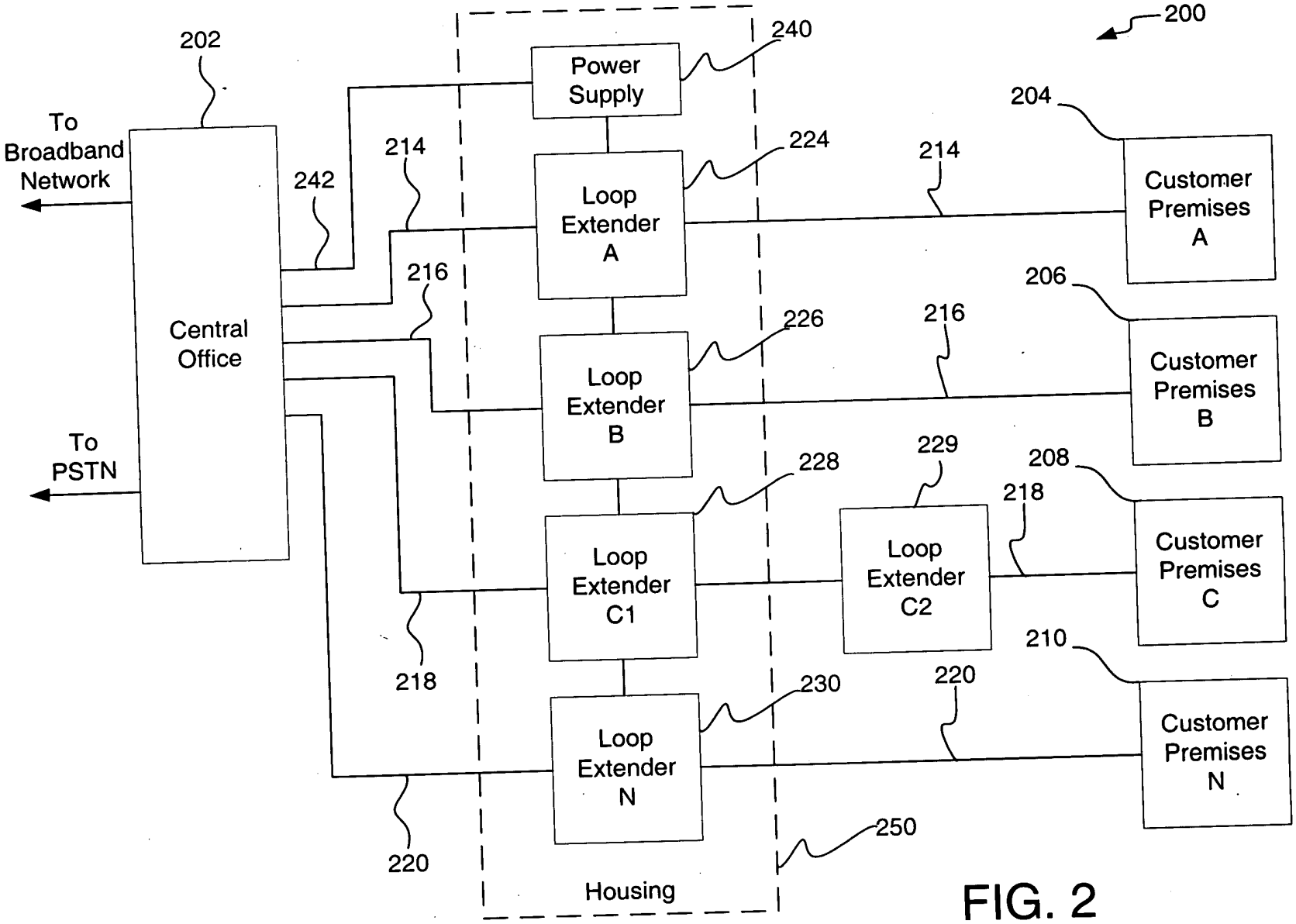

200
202
240
Power Supply
To Broadband Network
204
214
224
214
242
Loop Extender A
Customer Premises A
216
206
Central Office
226
216
Loop Extender B
Customer Premises B
To PSTN
228
229
208
218
Loop Extender C1
Loop Extender C2
Customer Premises C
218
210
230
220
Loop Extender N
Customer Premises N
220
250
Housing

FIG. 2

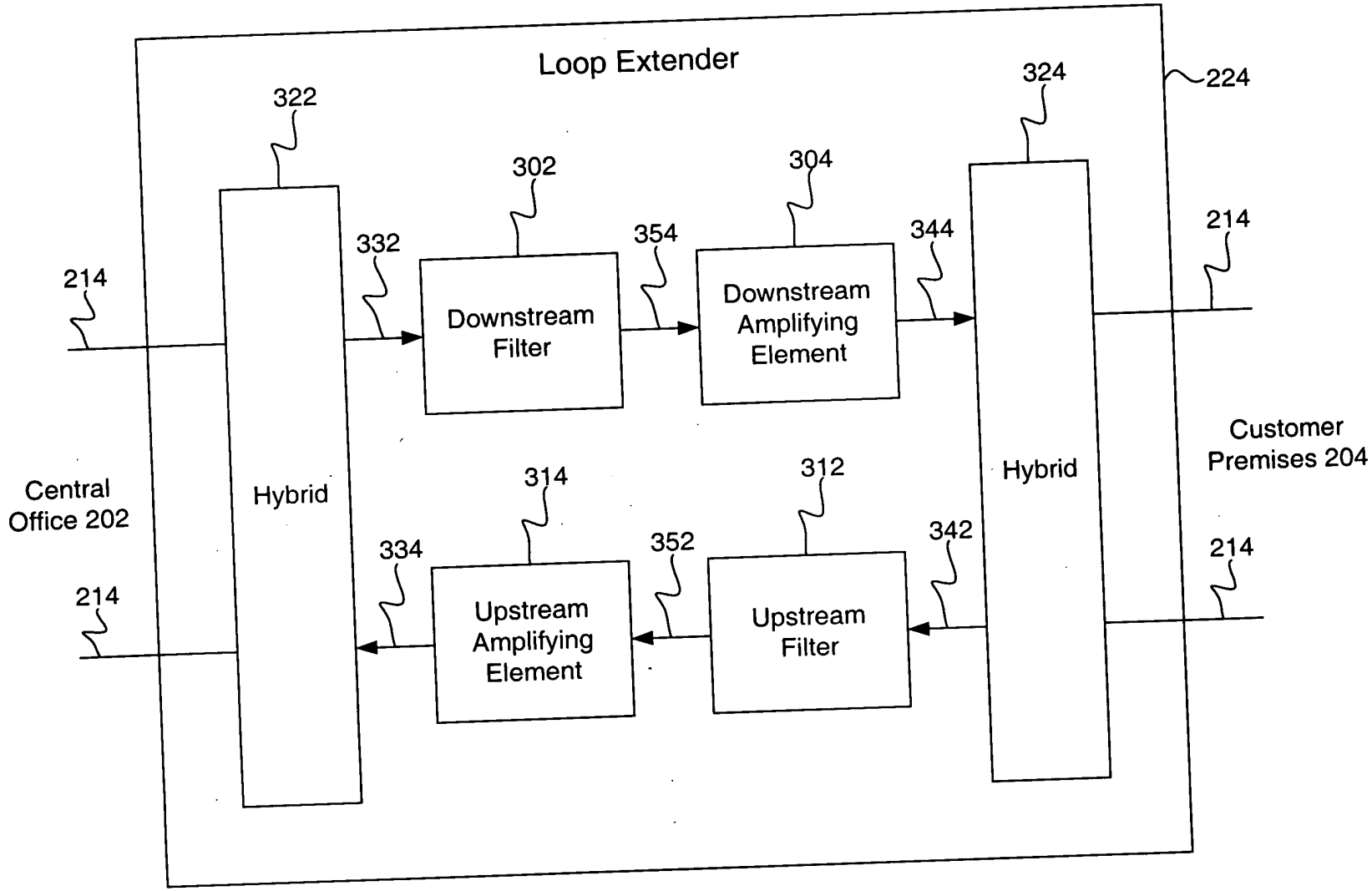


FIG. 3

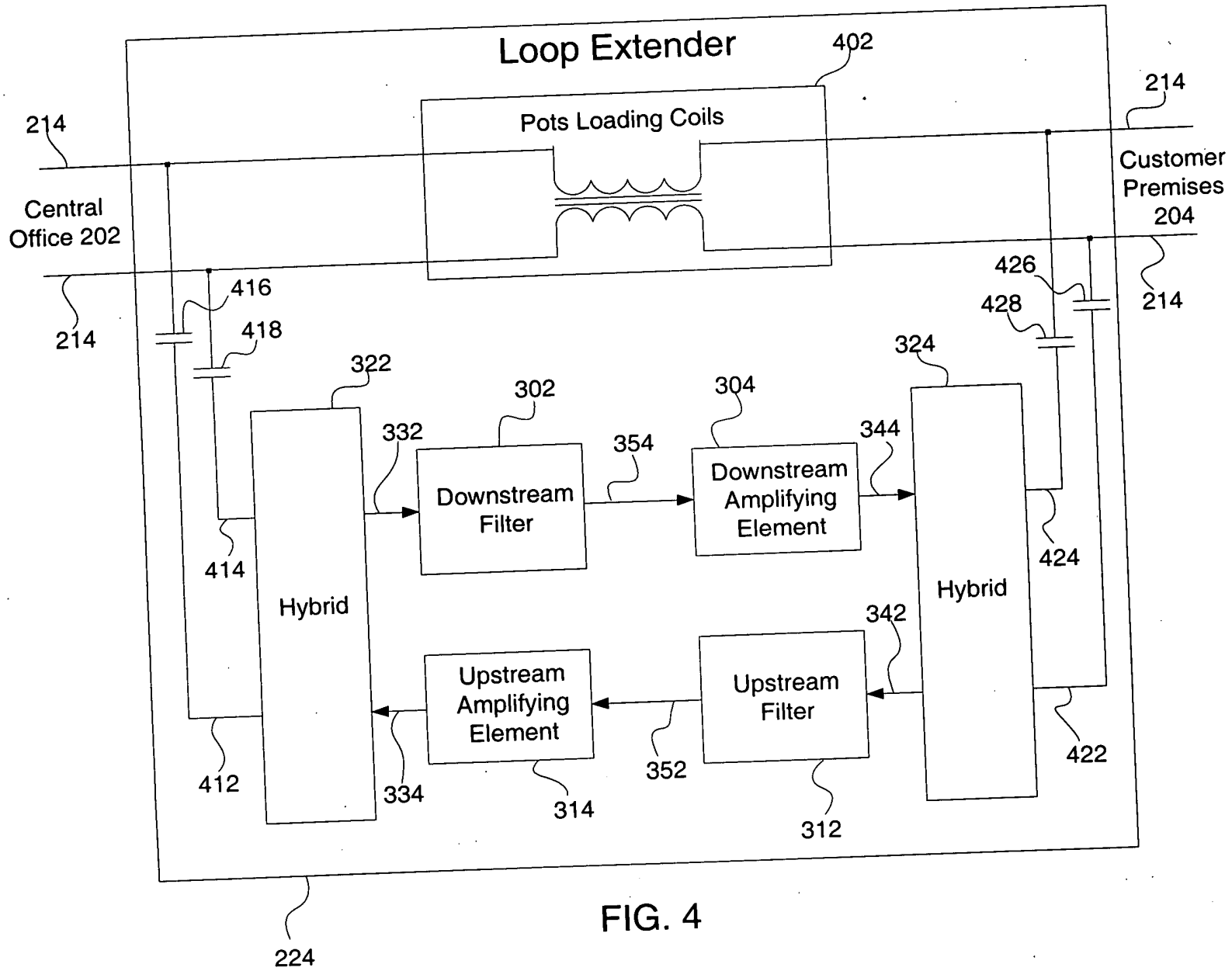


FIG. 4

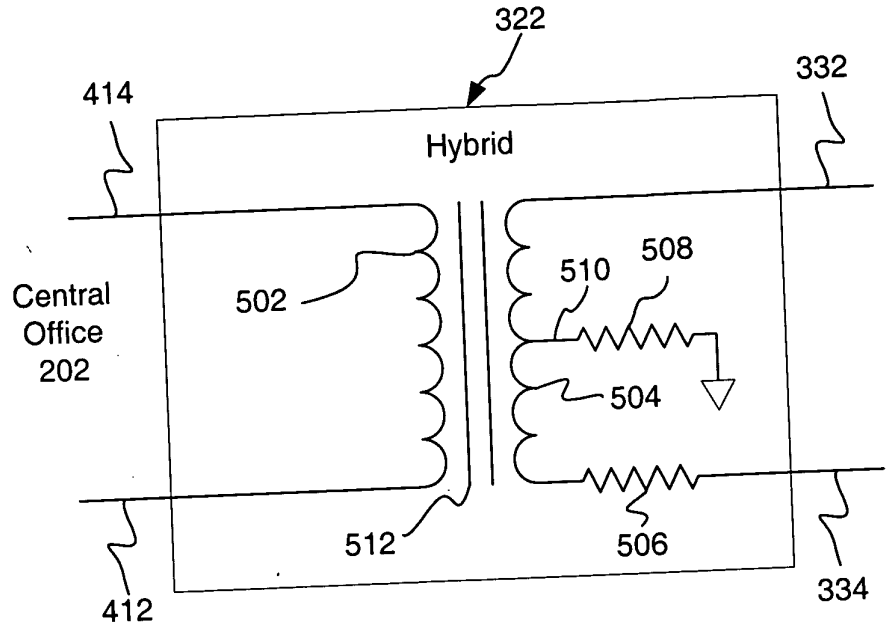

322
332
414
Hybrid
Central
Office
202
502
510
508
504
512
506
412
334

FIG. 5

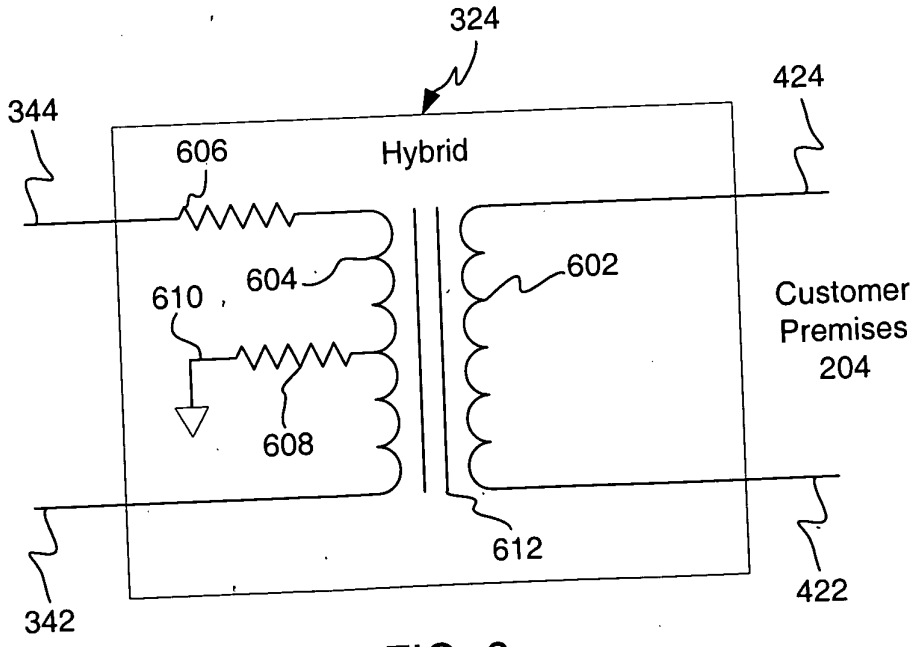

324
424
344
606
Hybrid
602
604
610
608
Customer
Premises
204
612
342
422

FIG. 6

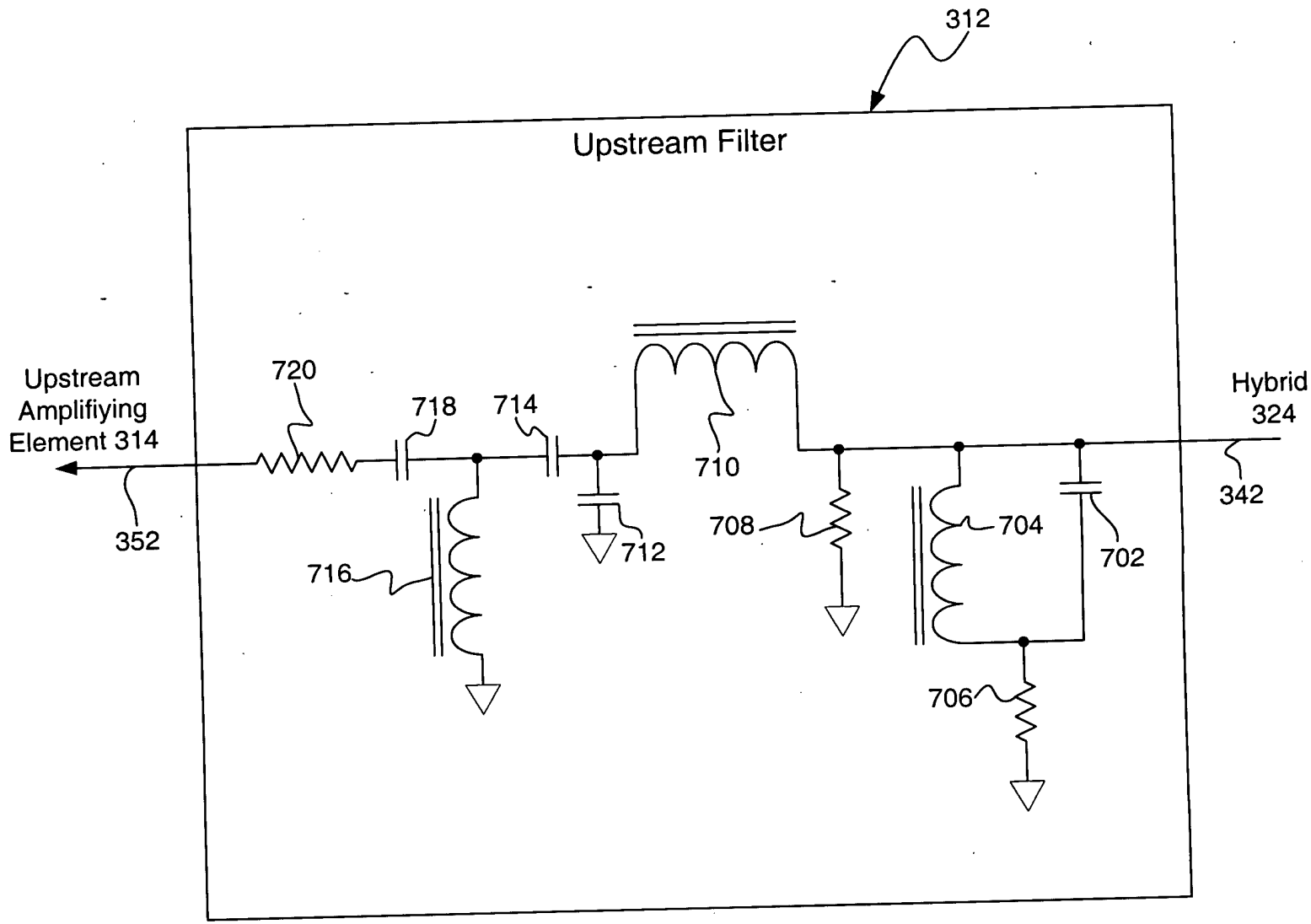


FIG. 7

Upstream Filter

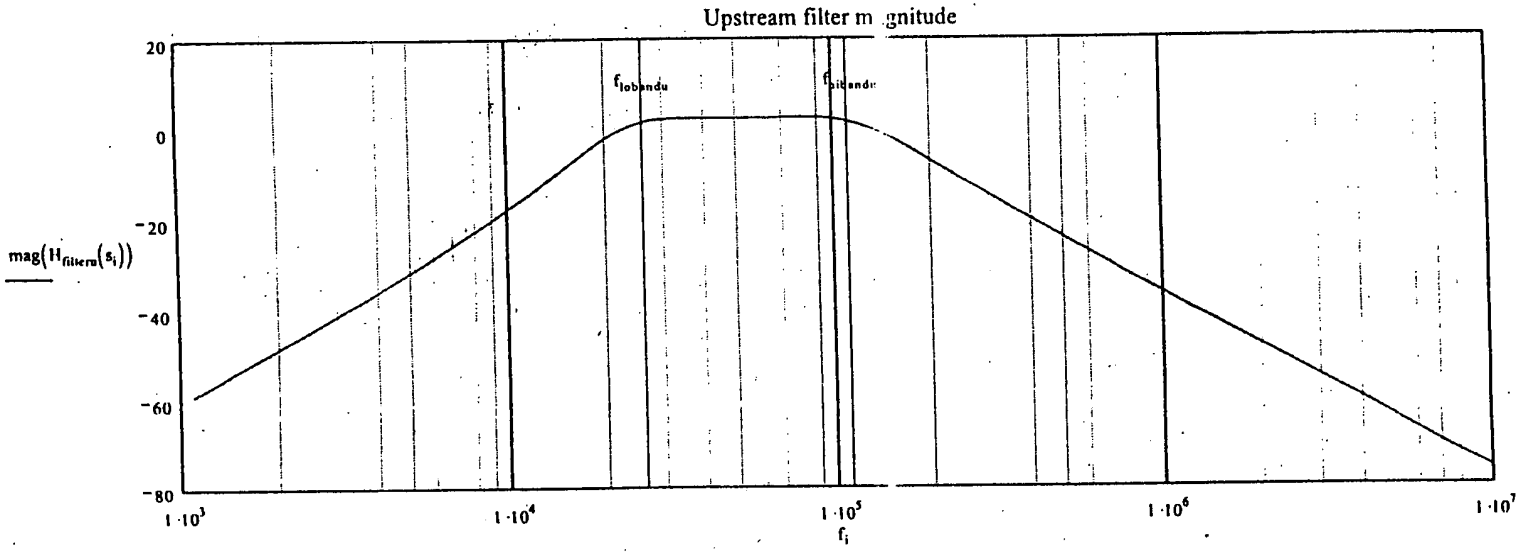


FIG. 8

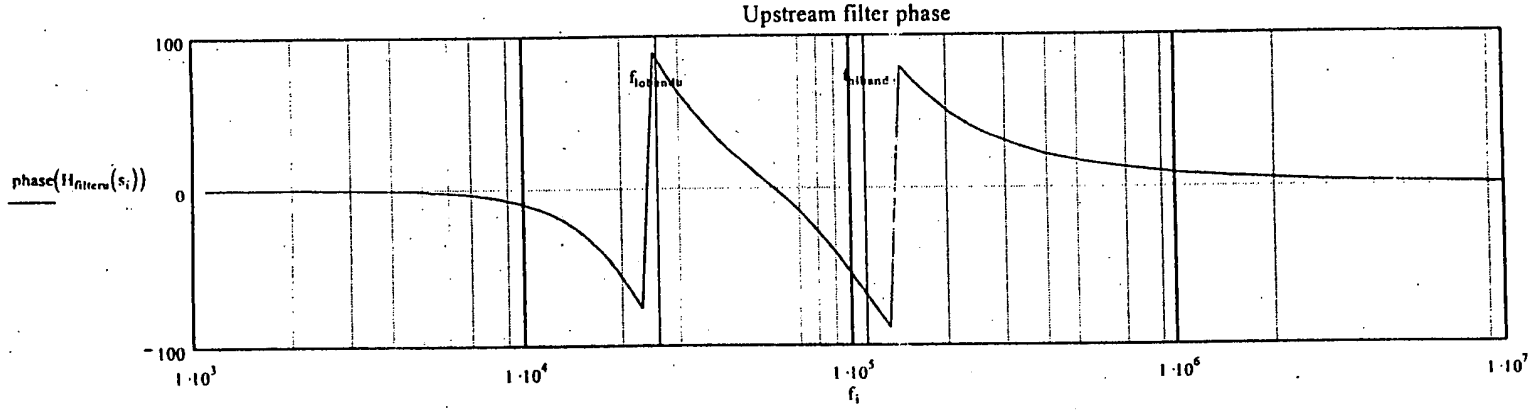


FIG. 9

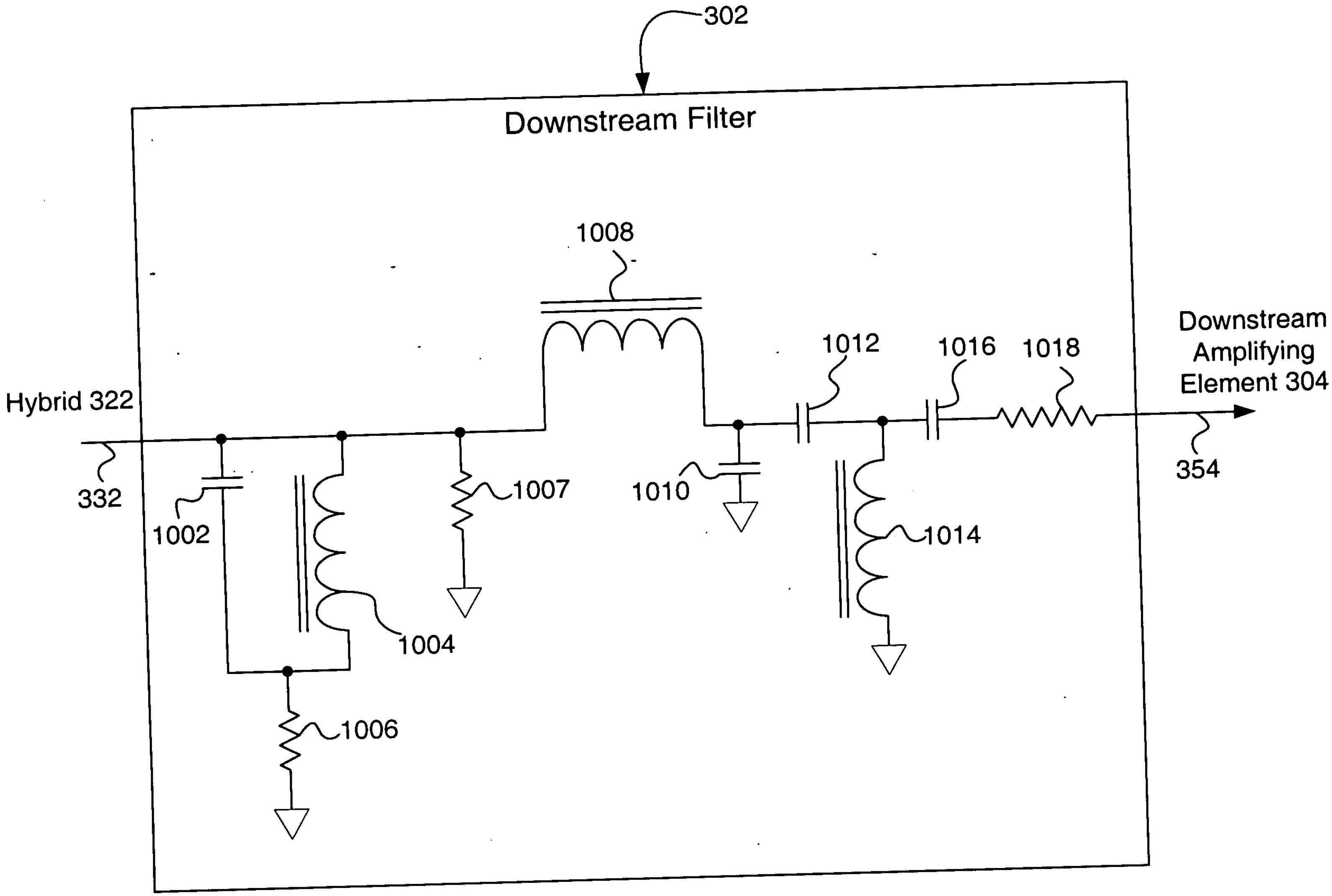


FIG. 10

Downstream Filter

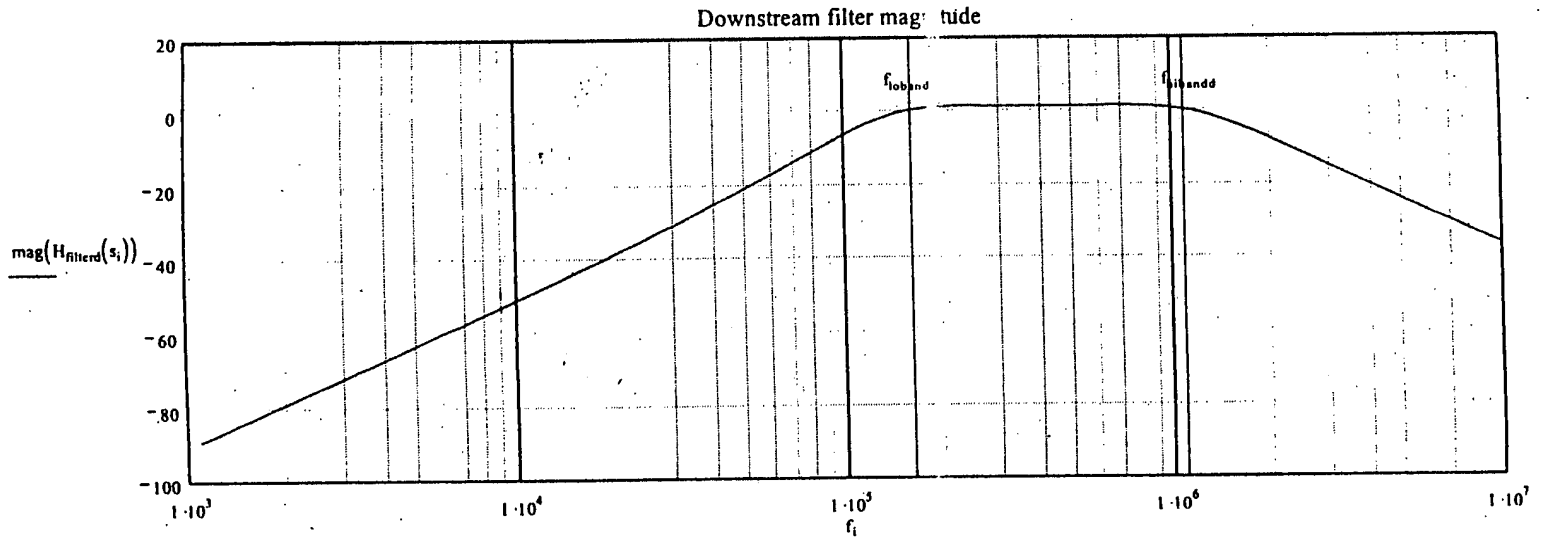


FIG. 11

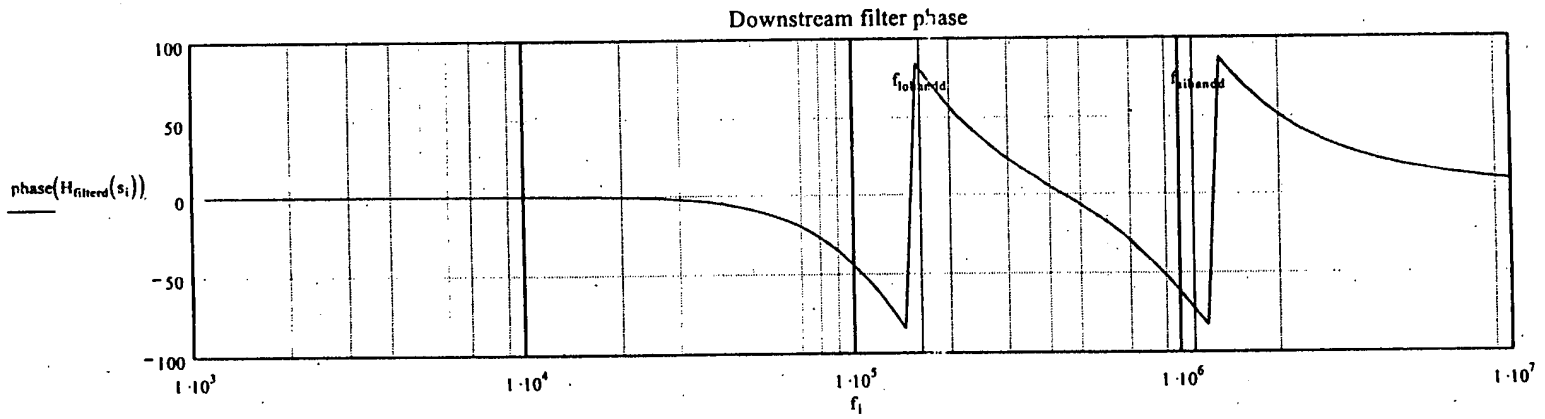


FIG. 12

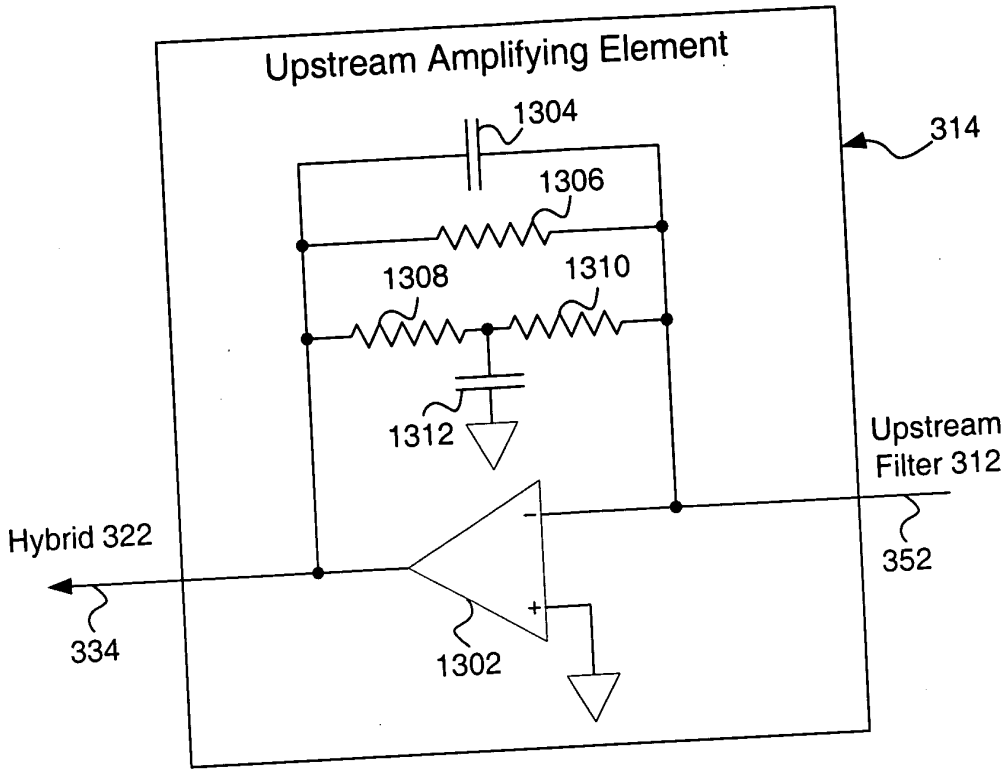

Upstream Amplifying Element
1304
314
1306
1308
1310
1312
Upstream
Filter 312
Hybrid 322
352
334
1302

FIG. 13

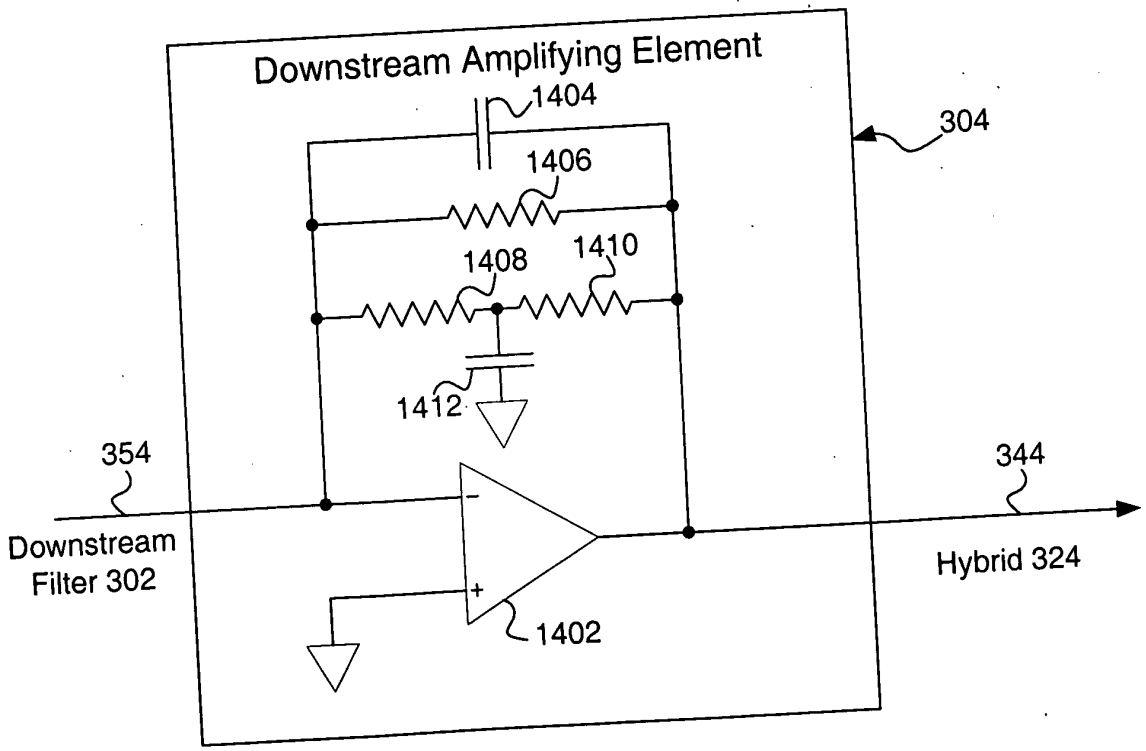

Downstream Amplifying Element
1404
304
1406
1408
1410
1412
354
344
Downstream
Filter 302
Hybrid 324
1402

FIG. 14

Upstream Equalizer

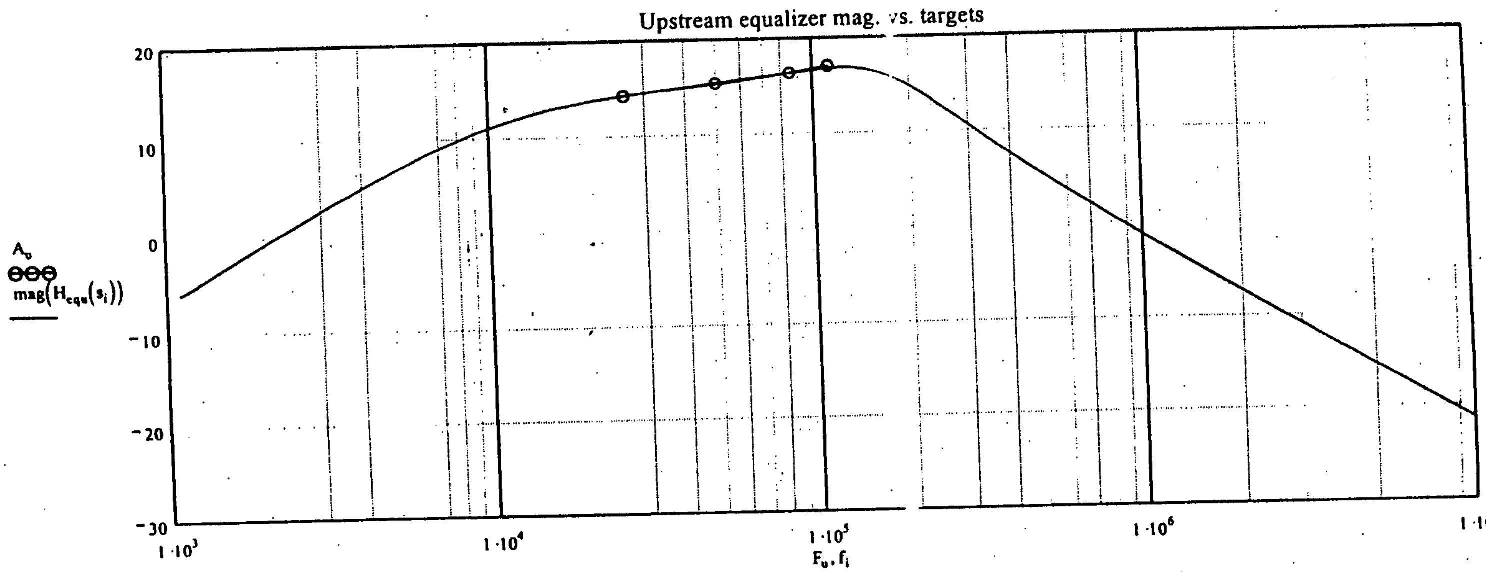


FIG. 15

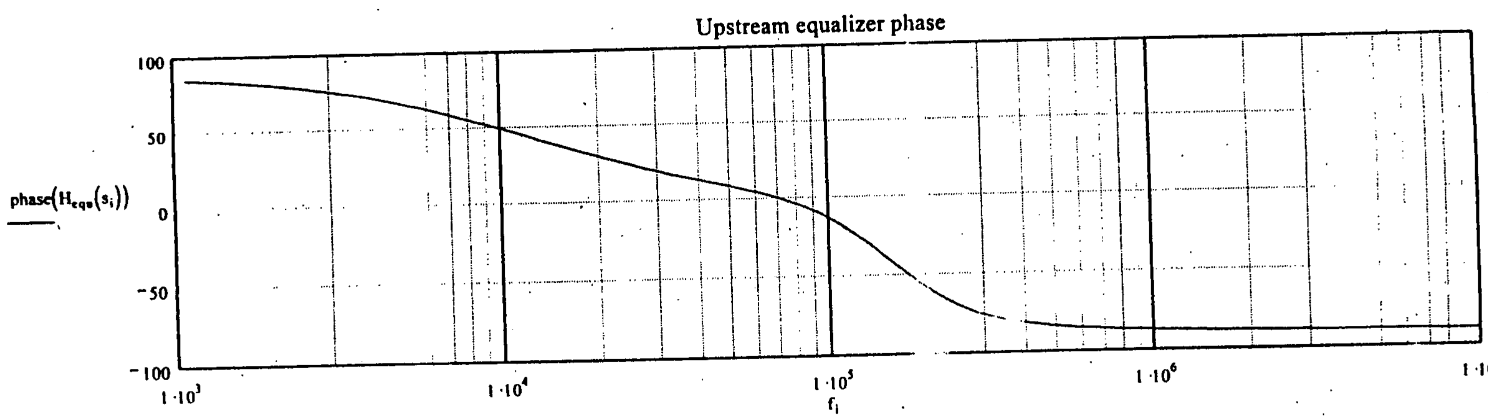


FIG. 16

Downstream Equalizer

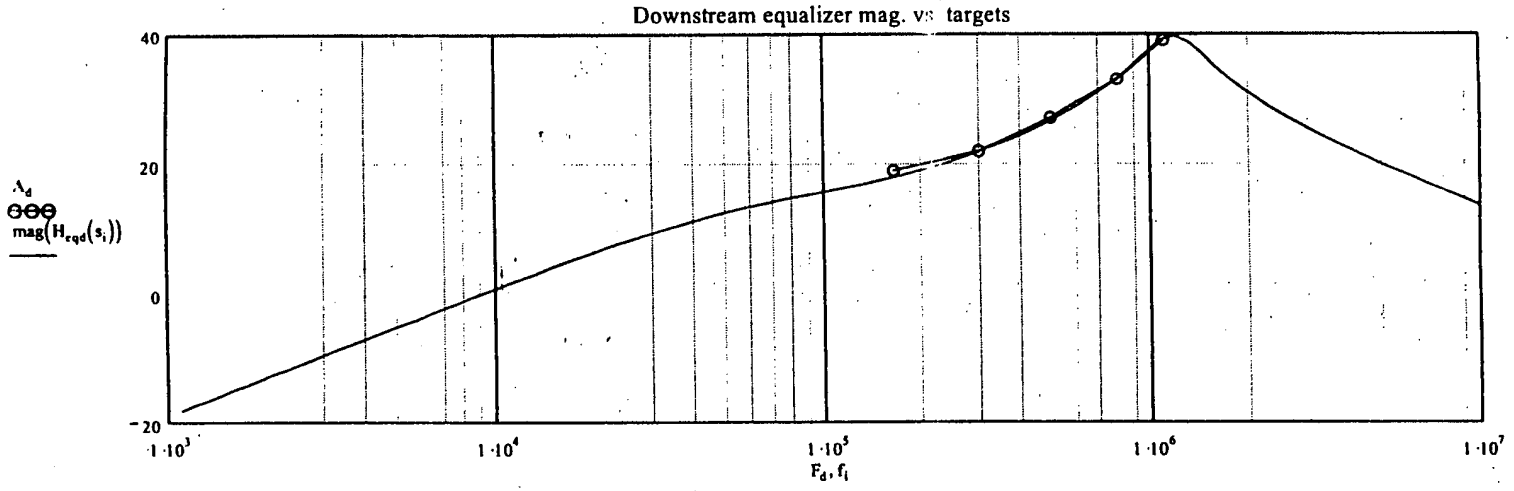


FIG. 17

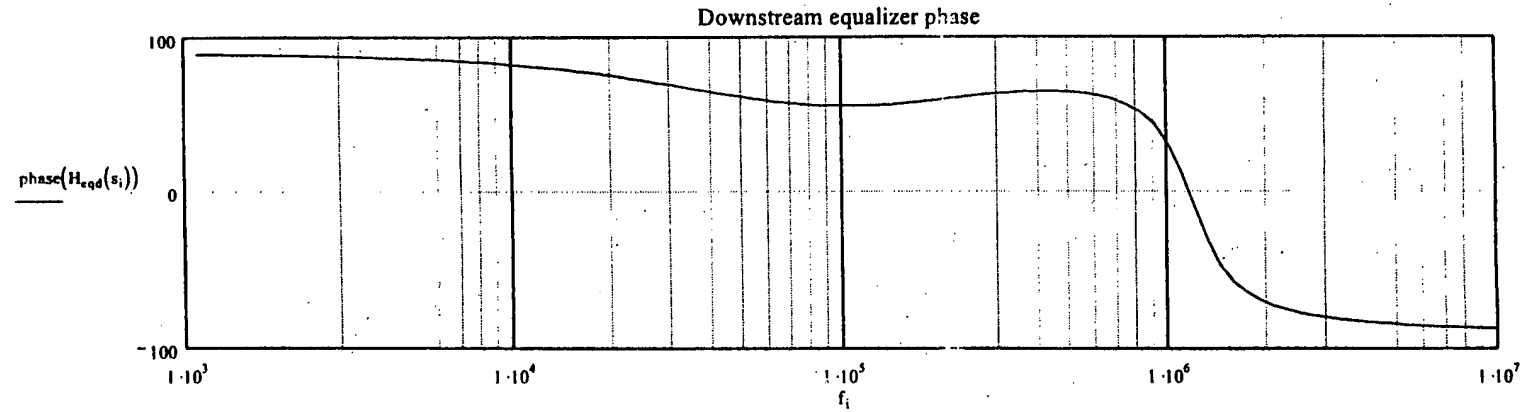


FIG. 18

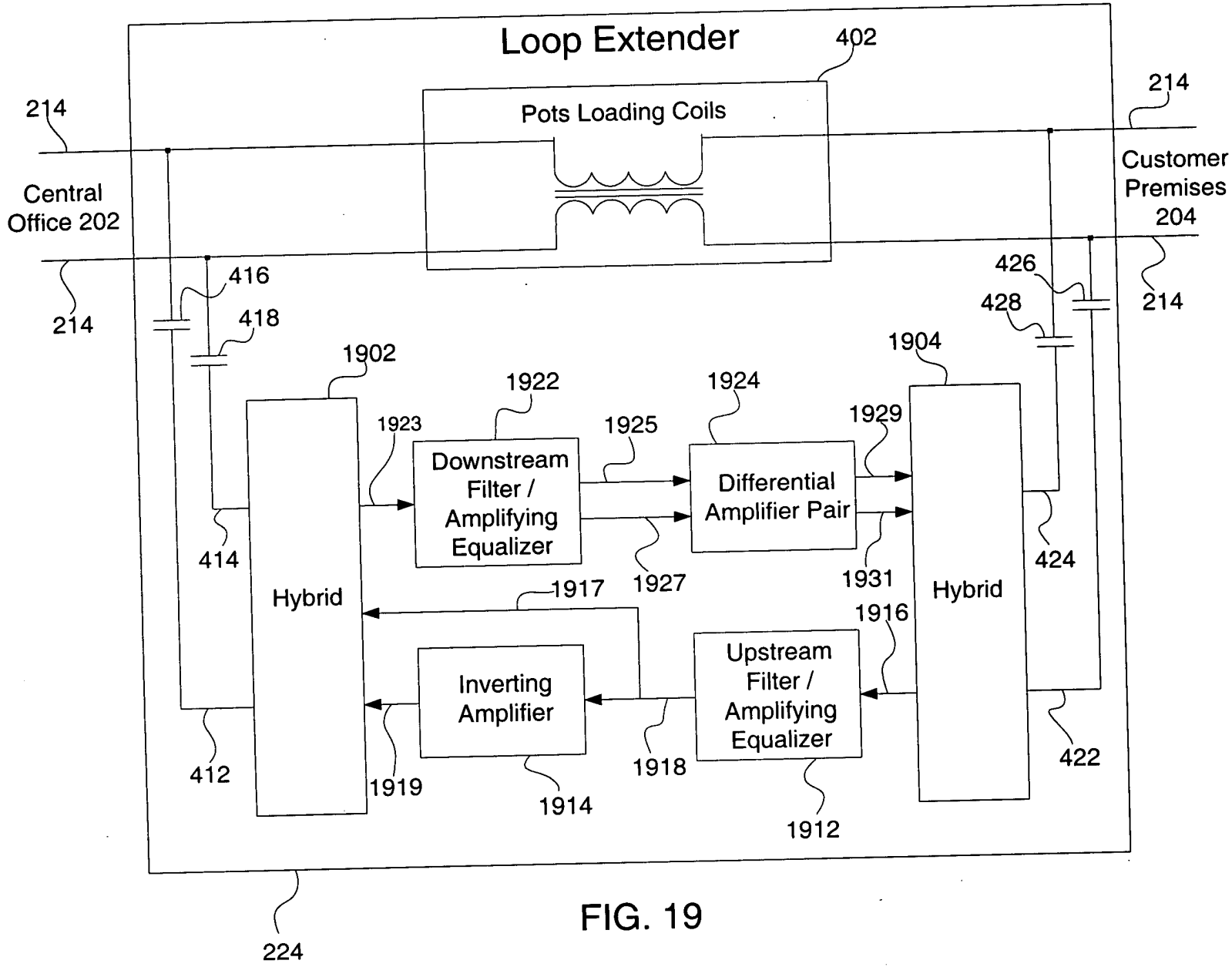


FIG. 19

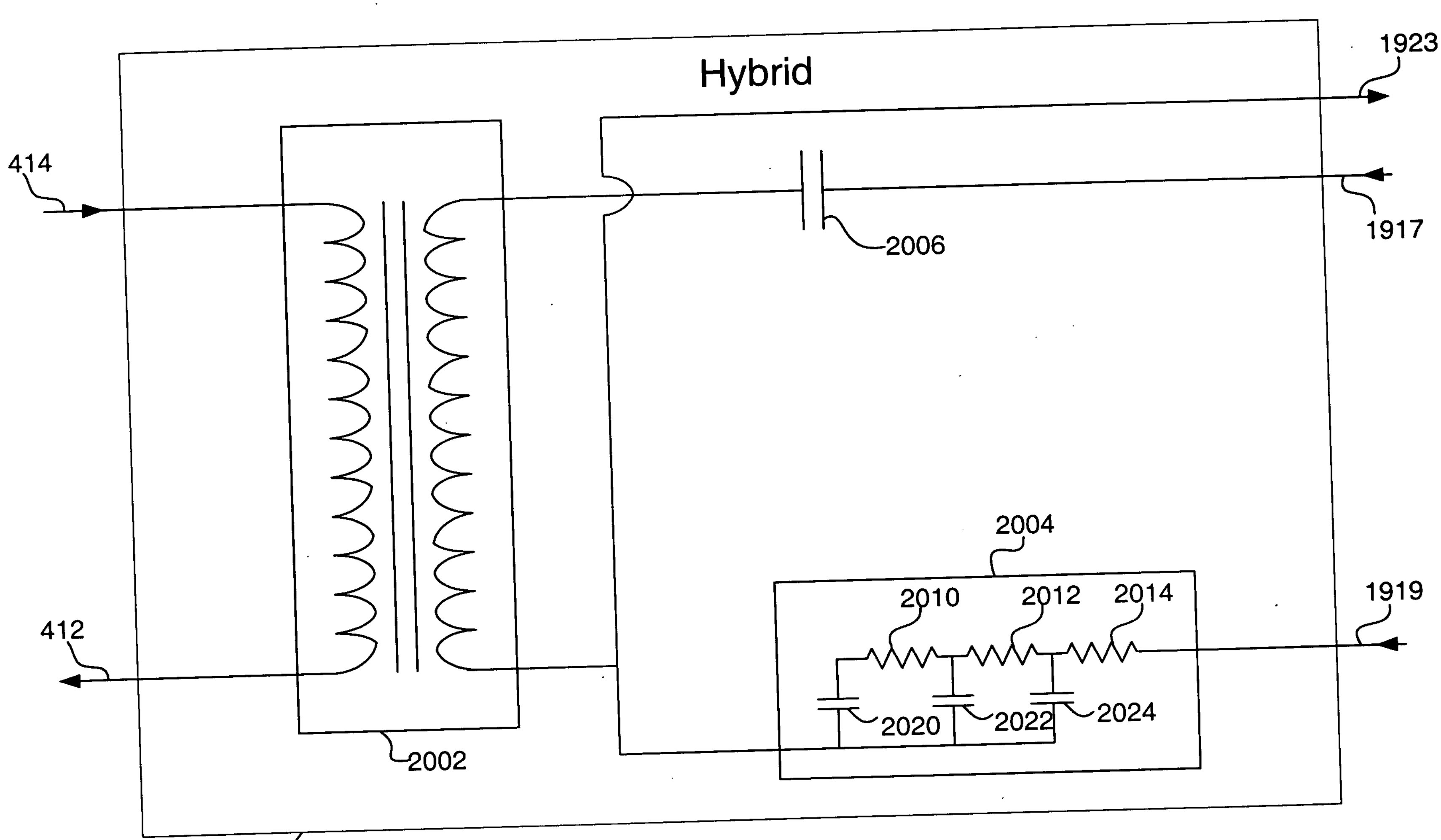

Hybrid
414
412
2002
2006
1923
1917
1919
2004
2010
2012
2014
2020
2022
2024
1902

FIG. 20

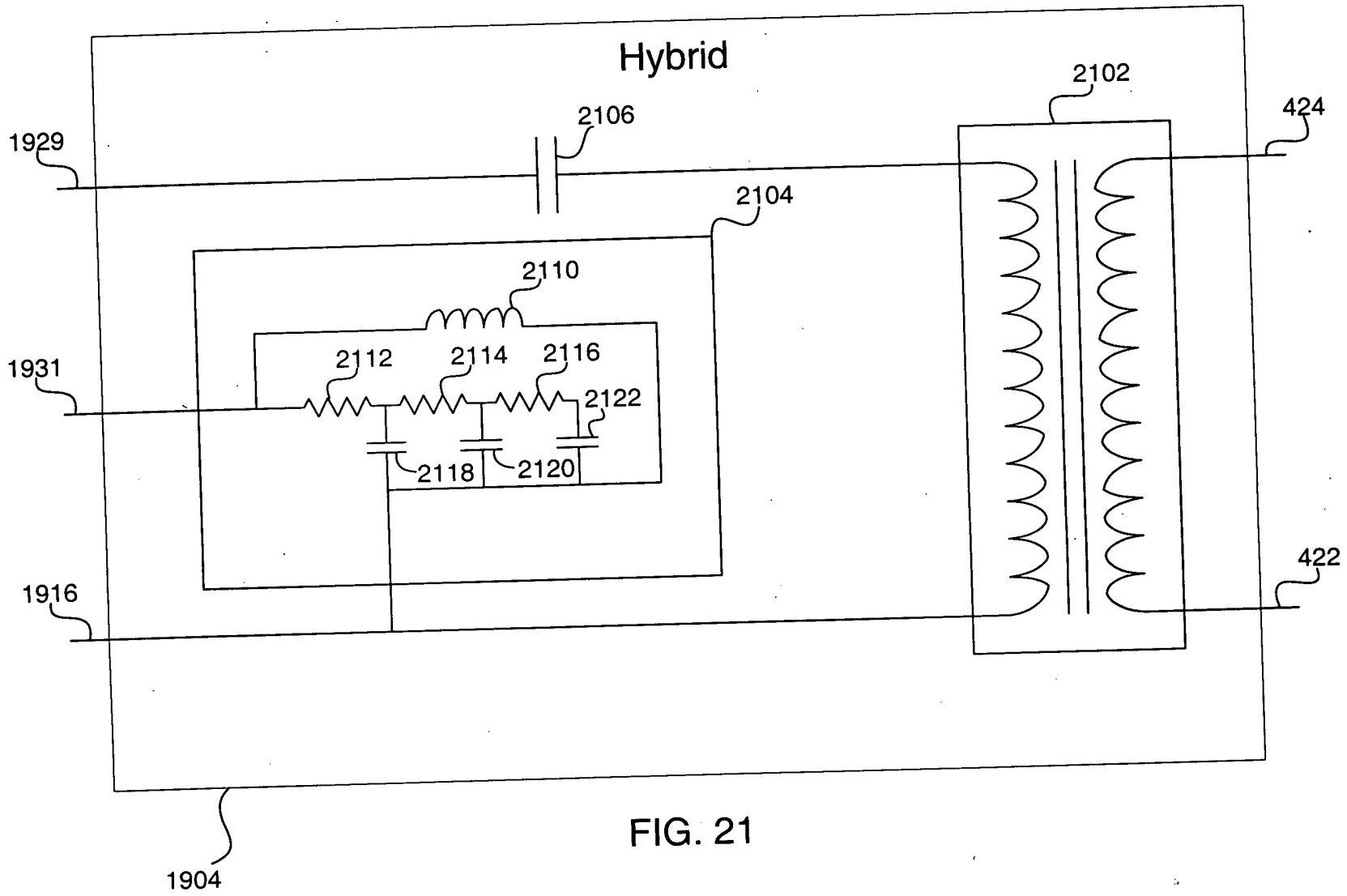


FIG. 21

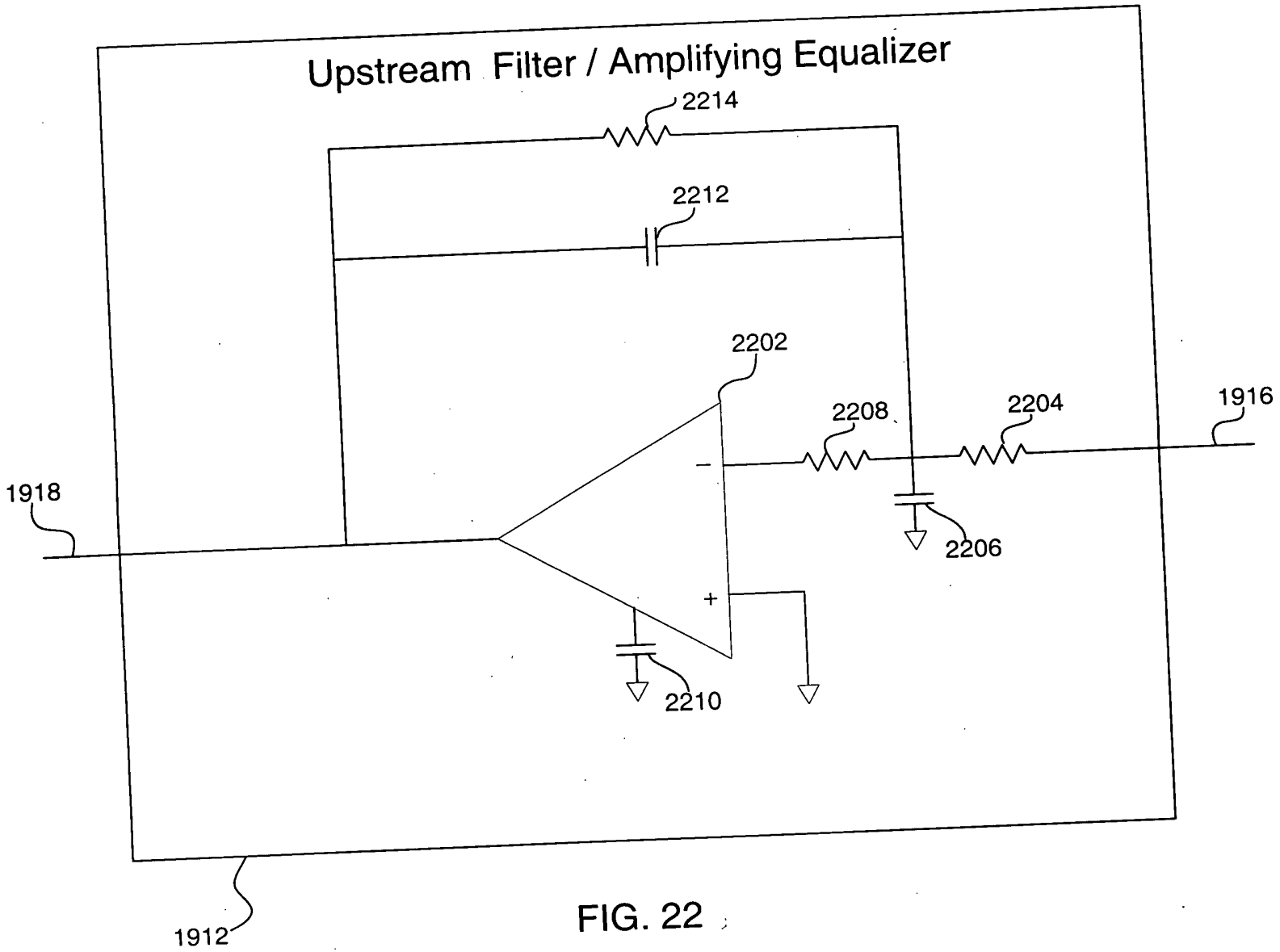


FIG. 22

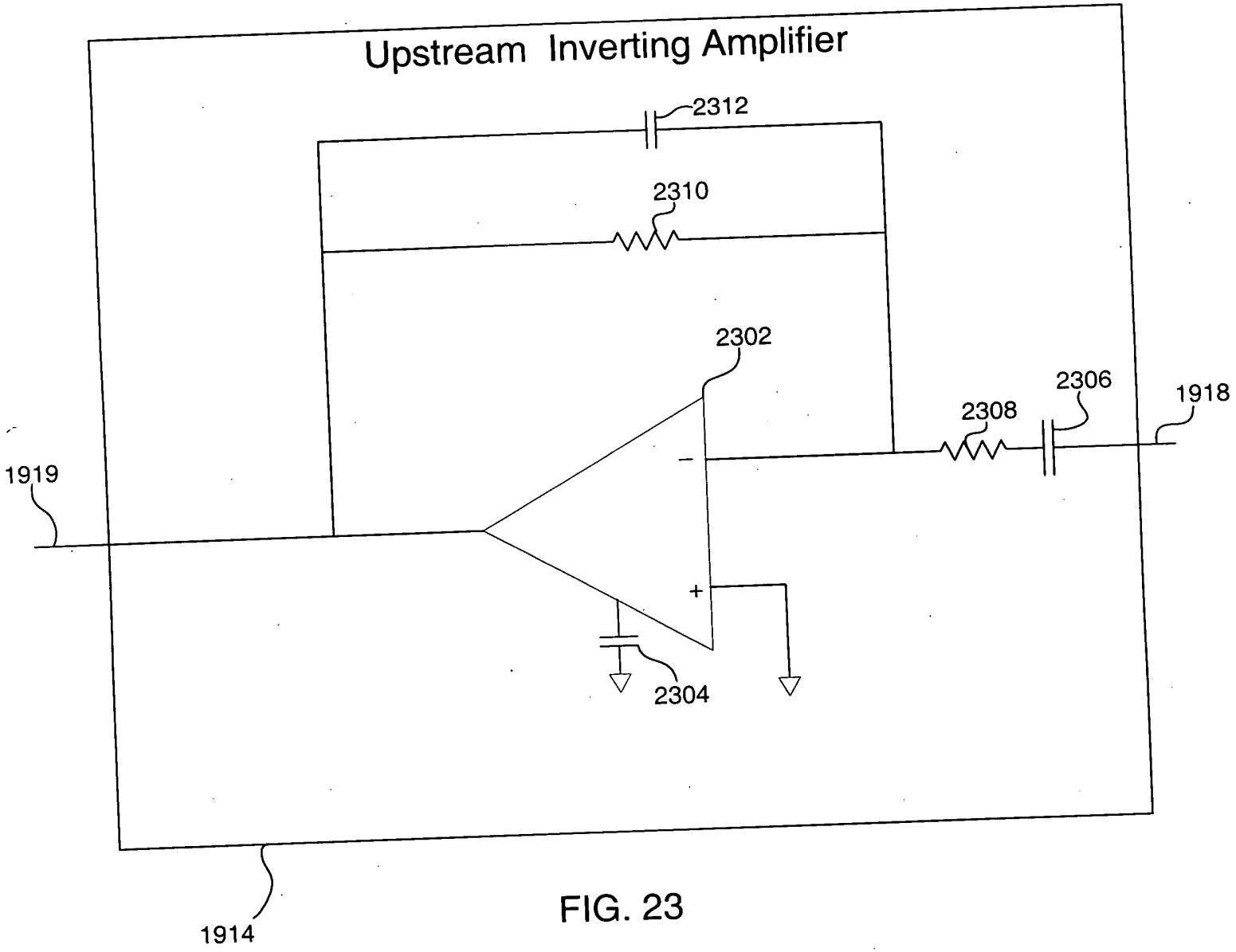


FIG. 23

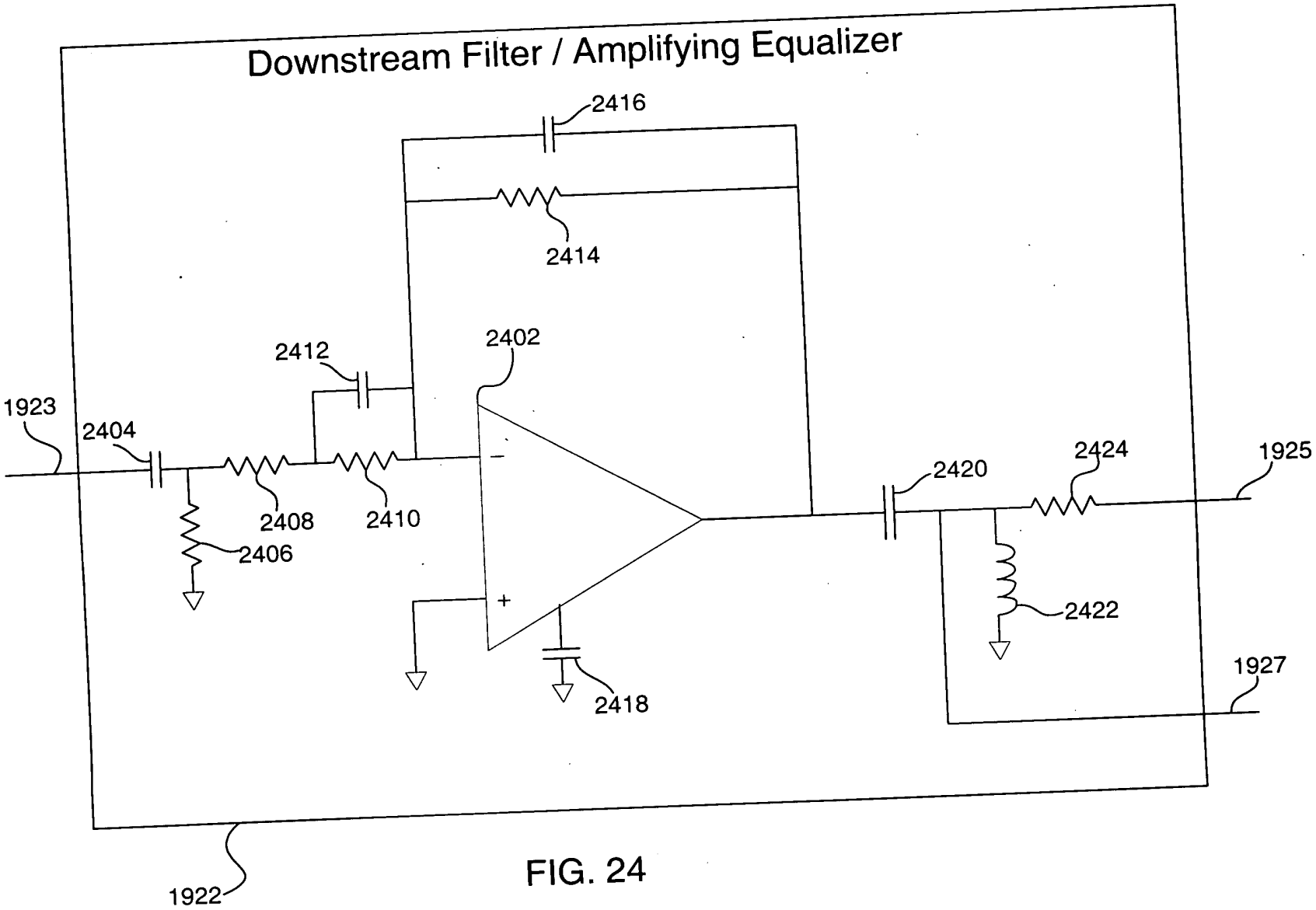


FIG. 24

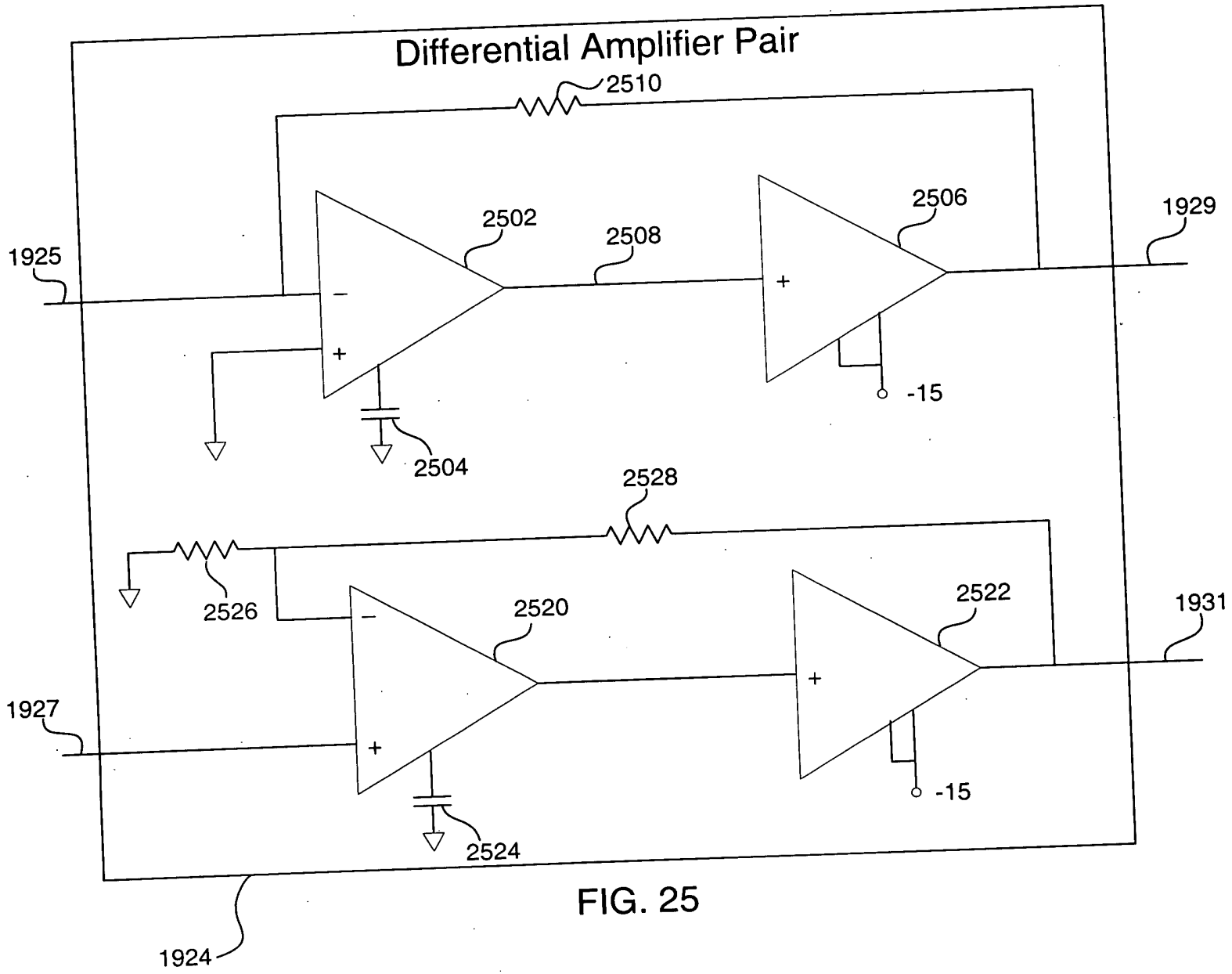
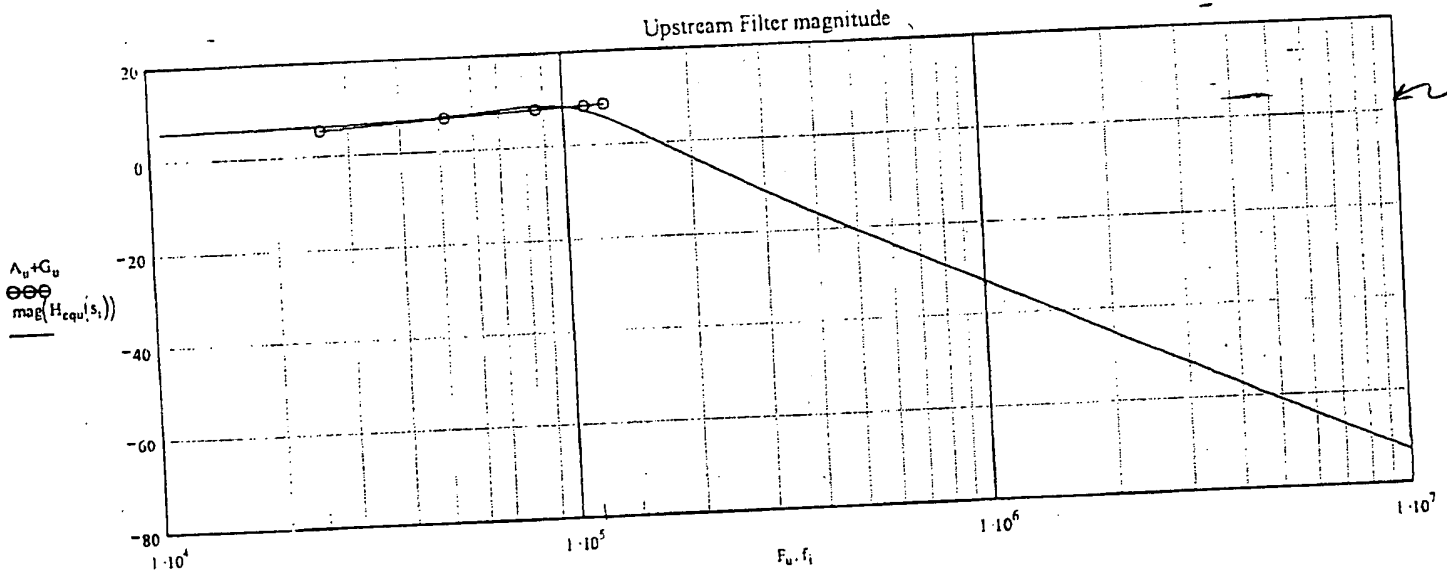


FIG. 25

target:

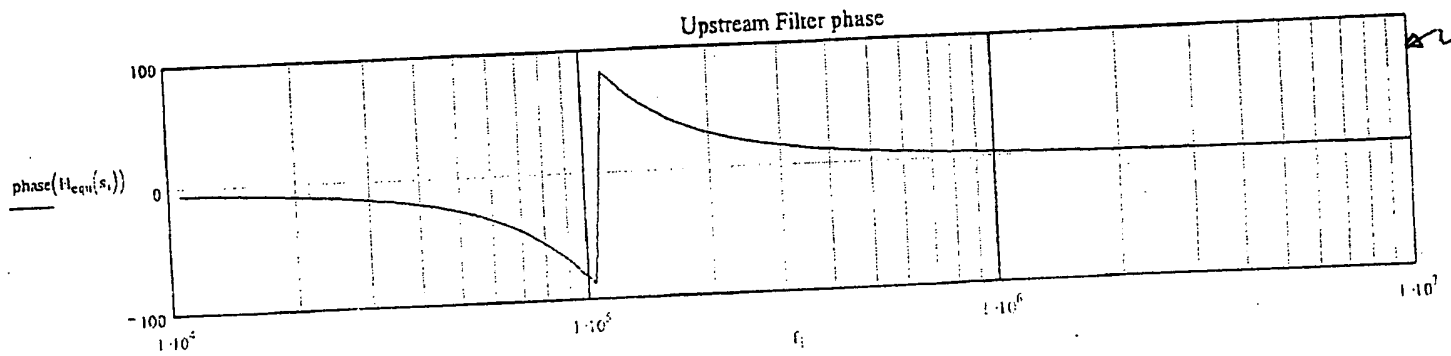
actual:

$$\Lambda_u + G_u = \begin{pmatrix} 5.4 \\ 7.1 \\ 8.1 \\ 8.5 \\ 8.7 \end{pmatrix} \qquad \overrightarrow{mag\left(H_{equ}\left(F_u \cdot 2 \cdot \pi \cdot j\right)\right)} = \begin{pmatrix} 6.371 \\ 7.374 \\ 8.754 \\ 7.48 \\ 5.935 \end{pmatrix}$$



2600

FIG. 26



2700

FIG. 27

FIG. 28

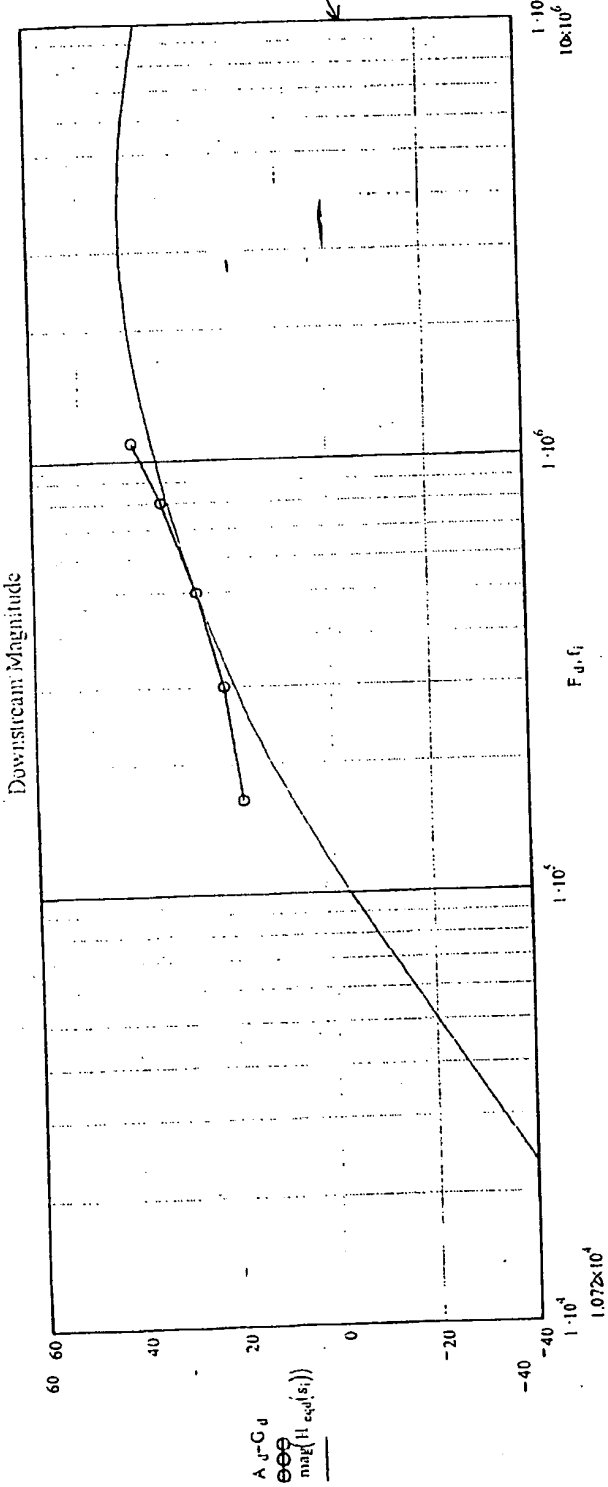
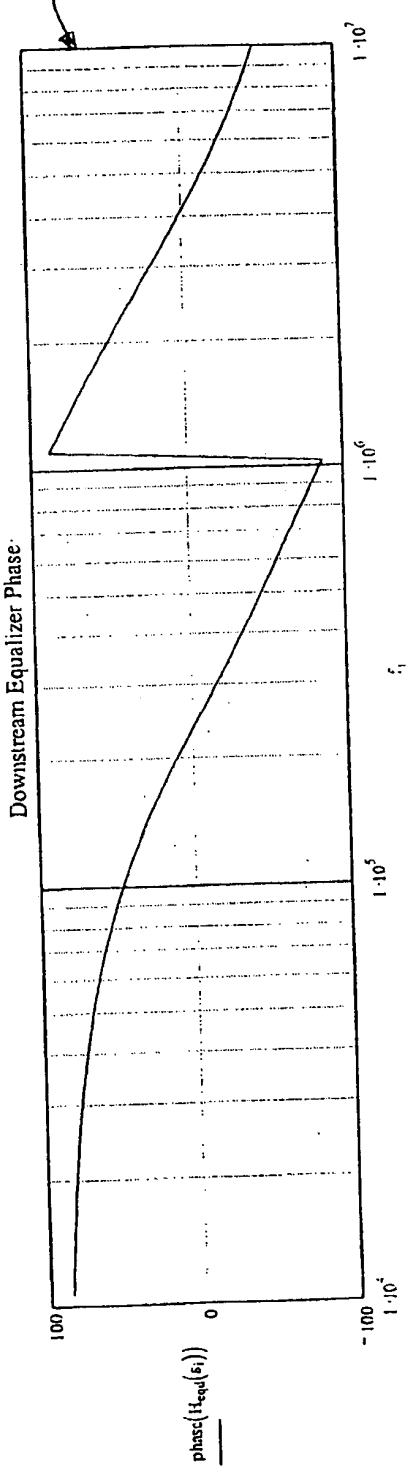

2800
Downstream Magnitude
60
40
20
0
-20
-40
1·10^7
10×10^6
1·10^6
1·10^5
1·10^4
1.072×10^4
F_d, f_i
A_d := G_d
mag(H_equ(f_i))

FIG. 29


2900
Downstream Equalizer Phase
100
0
-100
1·10^7
1·10^6
1·10^5
1·10^4
f_i
phase(H_equ(f_i))